

Application No. 09/617,663
Docket No. 2000U004.US
Reply to Office Action Dated 04/22/2003

Amendments to the Claims

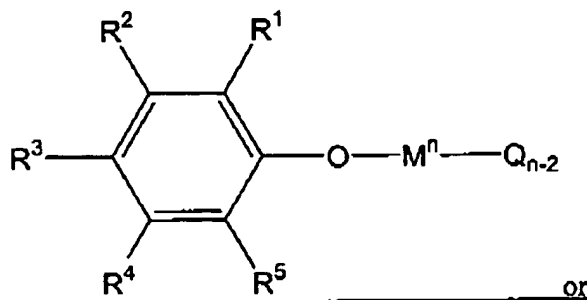
This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

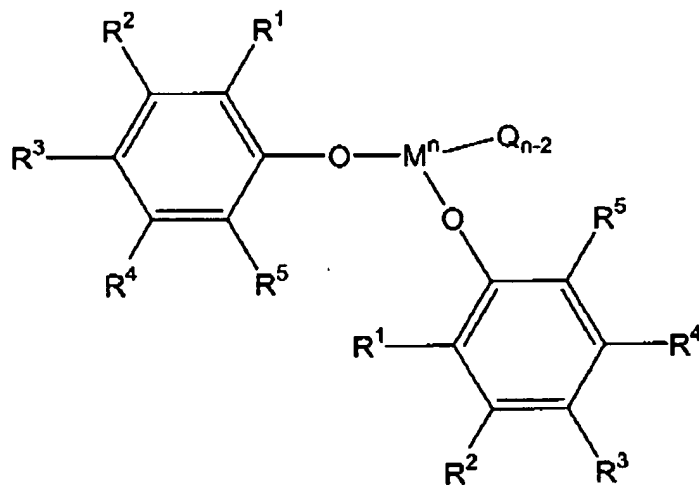
1-23. (Cancelled)

201 24. (Currently amended) A supported catalyst system comprising an iminophenoxide Group 4 catalyst compound, a bulky ligand metallocene catalyst compound, and a supported activator, wherein:

a) the iminophenoxide Group 4 catalyst compound is represented by the formulae:



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where R^1 to R^4 are independently hydrogen, C_1 to C_{10} heteroatom containing groups, or C_1 to C_{20} alkyl groups;

R^5 is an imine group bound to M;

O is oxygen;

M is a Group 4 metal;

n is the valence state of M; and

Q is an anionic ligand; and wherein

- b) the supported activator is a carrier material combined with an activator, the activator represented by the formula:



wherein each R is independently an alkyl group or a group represented by the formula $ArHal$, where $ArHal$ is a halogenated C_6 aromatic or higher carbon number polycyclic aromatic hydrocarbon or aromatic ring assembly; and n is 3; ~~and wherein the supported activator and iminophenoxide Group 4 catalyst compound are combined in a mole ratio (Al:Group 4 metal) of from 0.3:1 to 3:1.~~

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25. (Previously amended) The supported catalyst system of Claim 24, wherein the iminophenoxide Group 4 catalyst compound is selected from the group consisting of:

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bis(*N*-methyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-ethyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-*iso*-propyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-*t*-butyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-hexyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-phenyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-methyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dichloride;
bis(*N*-benzyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dipivalate;
bis(*N*-benzyl-3,5-di-*t*-butylsalicylimino)titanium(IV) dipivalate;
bis(*N*-benzyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) di(bis(dimethylamide));
bis(*N*-*iso*-propyl-3,5-di-*t*-amylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-*iso*-propyl-3,5-di-*t*-octylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-*iso*-propyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)zirconium(IV)
dibenzyl;
bis(*N*-*iso*-propyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)titanium(IV)
dibenzyl;
bis(*N*-*iso*-propyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)hafnium(IV)
dibenzyl;
bis(*N*-*iso*-butyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)zirconium(IV)
dibenzyl;
bis(*N*-*iso*-butyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)zirconium(IV)
dichloride;
bis(*N*-hexyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)zirconium(IV) dibenzyl;
bis(*N*-phenyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)zirconium(IV) dibenzyl;

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bis(*N*-*iso*-propyl-3,5-di-(1'-methylcyclohexyl)salicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3-triphenylmethylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-*iso*-propyl-3,5-di-trimethylsilylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-*iso*-propyl-3-(phenyl)salicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3-(2',6'-di-*iso*-propylphenyl)salicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3-(2',6'-di-phenylphenyl)salicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3-*t*-butyl-5-methoxysalicylimino)zirconium(IV) dibenzyl; and derivatives thereof.

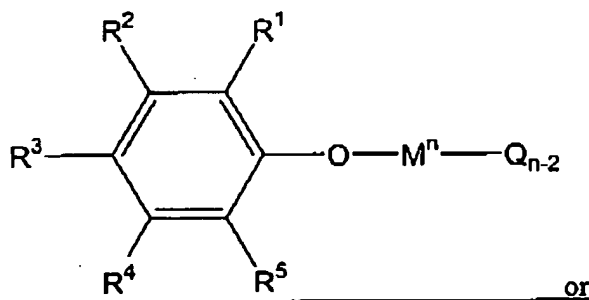
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26. (Previously added) The supported catalyst system of Claim 24, wherein the activator is tris(pentafluorophenyl)aluminum.
27. (Previously added) The supported catalyst system of Claim 24, wherein the support material contains surface hydroxyl groups.
28. (Previously added) The supported catalyst system of Claim 24, wherein the aluminum atom of the activator is covalently bonded to the support material.
29. (Previously amended) The supported catalyst system of Claim 24, wherein the iminophenoxide Group 4 catalyst compound is bis(4,6-di-*t*-butyl-2-*iso*-butyliminophenoxy)zirconium dibenzyl, bis(4,6-di-*t*-butyl-2-benzyliminophenoxy)zirconium dibenzyl, or derivatives thereof.
30. (Cancelled)
31. (Currently amended) A method of preparing a catalyst system comprising:
- a) contacting an aluminum containing Lewis acid activator with a carrier comprising surface hydroxyl groups in a hydrocarbon diluent to form a

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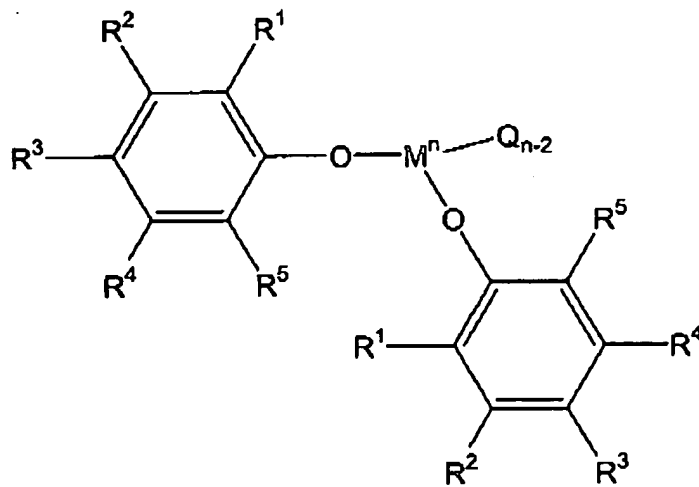
supported activator; wherein the supported activator comprises an activator covalently bound to the carrier;

- b) contacting the supported activator with an iminophenoxide Group 4 catalyst compound and a bulky ligand metallocene catalyst compound to form the catalyst system; ~~wherein the supported activator and iminophenoxide Group 4 catalyst compound are combined in a mole ratio (Al:Group 4 metal) of from 0.3:1 to 3:1.~~

32. (Previously added) The method of Claim 31, wherein the activator is added in a molar excess relative to the amount of surface hydroxyl groups of the carrier.
33. (Previously added) The method of Claim 31, wherein the carrier is calcined to up to 800°C prior to contacting with the activator.
34. (Currently amended) The method of Claim 31, wherein the iminophenoxide Group 4 catalyst compound is represented by the formulae:



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where R^1 to R^4 are independently hydrogen, C_1 to C_{10} heteroatom containing groups, or C_1 to C_{20} alkyl groups;

R^5 is an imine group bound to M;

O is oxygen;

M is a Group 4 metal;

n is the valence state of M; and

Q is an anionic ligand.

35. (Previously amended) The method of Claim 31, wherein the supported activator is a carrier material combined with an activator, the activator represented by the formula:



wherein each R is independently an alkyl group or a group represented by the formula ArHal, where ArHal is a halogenated C_6 aromatic or higher carbon number polycyclic aromatic hydrocarbon or aromatic ring assembly; and n is 3.

36. (Previously amended) The method of Claim 31, wherein the iminophenoxide Group 4 catalyst compound is selected from the group consisting of:

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bis(*N*-methyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-ethyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-iso-propyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-*t*-butyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-hexyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-phenyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-methyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dichloride;
bis(*N*-benzyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) dipivalate;
bis(*N*-benzyl-3,5-di-*t*-butylsalicylimino)titanium(IV) dipivalate;
bis(*N*-benzyl-3,5-di-*t*-butylsalicylimino)zirconium(IV) di(bis(dimethylamide));
bis(*N*-iso-propyl-3,5-di-*t*-amylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-iso-propyl-3,5-di-*t*-octylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-iso-propyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)zirconium(IV)
dibenzyl;
bis(*N*-iso-propyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)titanium(IV)
dibenzyl;
bis(*N*-iso-propyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)hafnium(IV)
dibenzyl;
bis(*N*-iso-butyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)zirconium(IV)
dibenzyl;
bis(*N*-iso-butyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)zirconium(IV)
dichloride;
bis(*N*-hexyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)zirconium(IV) dibenzyl;
bis(*N*-phenyl-3,5-di-(1',1'-dimethylbenzyl)salicylimino)zirconium(IV) dibenzyl;
bis(*N*-iso-propyl-3,5-di-(1'-methylcyclohexyl)salicylimino)zirconium(IV) .
dibenzyl;
bis(*N*-benzyl-3-*t*-butylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3-triphenylmethylsalicylimino)zirconium(IV) dibenzyl;
bis(*N*-iso-propyl-3,5-di-trimethylsilylsalicylimino)zirconium(IV) dibenzyl;

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bis(*N*-*iso*-propyl-3-(phenyl)salicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3-(2',6'-di-*iso*-propylphenyl)salicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3-(2',6'-di-phenylphenyl)salicylimino)zirconium(IV) dibenzyl;
bis(*N*-benzyl-3-*t*-butyl-5-methoxysalicylimino)zirconium(IV) dibenzyl; and
derivatives thereof.

37. (Previously added) The method of Claim 31, wherein the activator is tris(pentafluorophenyl)aluminum.

38. (Previously added) The method of Claim 31, wherein the support material contains surface hydroxyl groups.

39. (Previously added) The method of Claim 31, wherein the aluminum atom of the activator is covalently bonded to the support material to form the supported activator.

40. (Previously amended) The method of Claim 31, wherein the iminophenoxide Group 4 catalyst compound is bis(4,6-di-*t*-butyl-2-*iso*-butyliminophenoxy)zirconium dibenzyl, bis(4,6-di-*t*-butyl-2-benzyliminophenoxy)zirconium dibenzyl, or derivatives thereof.

41. (Cancelled)